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BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte KEITH C. HONG, HUSNU M. KALKANOGLU, and
MING L. SHIAO

Appeal 2009-005841
Application 10/600,847
Technology Center 1700

Decided: September 30, 2009

Before CHUNG K. PAK, PETER F. KRATZ, and MARK NAGUMO,
Administrative Patent Judges.

KRATZ, *Administrative Patent Judge*.

DECISION ON APPEAL

This is a decision on an appeal under 35 U.S.C. § 134 from the Examiner's final rejection of claims 1-9, 23, and 25-34. We have jurisdiction pursuant to 35 U.S.C. § 6. Oral arguments were presented on September 17, 2009.

Appellant's claimed invention is directed to a method of producing algae-resistant roofing granules employing a void-forming material.

Claim 3 is illustrative of the claimed subject matter and is reproduced below:

3. A process for producing algae-resistant roofing granules, the process comprising:

(a) providing inert base particles;

(b) forming first intermediate particles by coating the inert base particles with a first mixture including;

at least one algaecidal material comprising cuprous oxide, and

a void-forming material, the void-forming material releasing gaseous material at temperatures above 90 °C, and having an average particle size no larger than 2mm,

to form first layer on the inert base particles;

(c) forming second intermediate particles by coating the first intermediate particles with a second mixture including a binder and a coloring material and not including a void-forming material; and

(d) heating the second intermediate particles to release the gaseous material and form pores in the first layer to produce the roofing granules.

The Examiner refers to the following prior art evidence[1]:

Skadulis	3,528,842	Sept. 15, 1970
Joedicke	4,378,408	Mar. 29, 1983
Greenberg	3,918,407	Nov. 11, 1975
McMahon	3,507,676	Apr. 21, 1970
Hojaji	4,430,108	Feb. 7, 1984
Adsetts	4,145,400	Mar. 20, 1979

[1] The Examiner acknowledges that Adsetts, Arnold, Herbig, and Smith are not being relied upon (Ans., pp. 8 and 9). Accordingly, we shall not consider these references as being part of the evidence that is relied upon by the Examiner in rejecting the appealed claims, not withstanding the Examiner's further referrals to at least some of this evidence in responding to Appellants' arguments and evidence (Ans. 13-17). *See In re Hoch*, 428 F.2d 1341, 1342 n.3 (CCPA 1970).

Arnold	3,961,628	Jun. 8, 1976
Herbig	5,879,752	Mar. 2, 1999
Smith	5,888,930	Mar. 30, 1999

Claims 3, 4, 7, 11, 16-21, 23, 28-32, and 36-41 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Skadulis in view of Joedicke. Claims 3, 4, 7, 11, 16-21, 23, 28-32, and 36-41 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Skadulis in view of Greenburg. Claims 12, 13, and 33 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Skadulis in view of Joedicke or Greenburg, and McMahon. Claims 14, 15, 34, and 35 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Skadulis in view of Joedicke or Greenburg, and Hojaji.

We reverse the stated rejection for reasons set forth in the Appeal Brief and Reply Brief.

The Examiner recognizes that Skadulis does not teach using a void forming material in coating a roofing granule with a coating that includes an algaecide, particularly a void-forming material together with an algaecide and binder in forming a first layer cover for a roofing granule, wherein a second layer coating including a binder and colorant, without a void-forming material, is subsequently applied over the first layer coating, as required by the appealed claims (Ans. 4 and 6).

The Examiner turns to Joedicke or Greenberg for allegedly suggesting a modification of Skadulis - the use of void-forming material in forming an inner coating layer on a roofing granule in the coating method otherwise allegedly taught or suggested by Skadulis by itself (Ans. 4-7).

Appellants contend that Joedicke is concerned with reducing the use of expensive titanium dioxide pigment and uses light scattering void-

forming material to that end, in forming a layer that receives light, that is, a visible layer, as supported by the Declaration of Dr. Hong (App. Br., pp. 4 and 5, Hong Decl., para. 7). Moreover, Appellants assert that the Examiner has not reasonably established that the second coating layer of Skadulis would be expected to be transparent to light, as would be required for one of ordinary skill in the art to even entertain the addition of void-forming material, as taught by Joedicke, to the materials used in forming Skadulis' first coating layer based on the Examiner's asserted theory as to why one of ordinary skill in the art would have combined these teachings from the applied references (see, e.g., App. Br. 4-11).

As for the Examiner's proposed combination of Greenberg and Skadulis, Appellants maintain that Greenberg is directed to controlling the release of flea insecticide from a collar to be worn by an animal, such as a cat or dog, by adding a porosity control agent, which is distinctly differing subject matter that is not analogous to the subject matter of the present invention and that of Skadulis (App. Br. 12-16). Appellants contend that, even if Greenberg was taken as relevant prior art to the present invention, Greenberg would not have suggested a modification to forming the inner coating of the method of covering a roofing granule taught or suggested by Skadulis because Greenberg is concerned with an additive that provides porosity at the surface of a flea collar (App. Br. 16-17).

PRINCIPAL ISSUES

Have Appellants established reversible error in the Examiner's obviousness rejection over Skadulis in view of Joedicke because the Examiner has not reasonably established that Joedicke would have suggested introducing a light scattering gas forming compound as part of an inner coating layer of the roofing granules of Skadulis, which granules of Skadulis

include an outer layer that would have been expected to forestall light transmission into the inner layer, as would have been understood by one of ordinary skill in the art?

Have Appellants established reversible error in the Examiner's obviousness rejection over Skadulis in view of Greenberg because the Examiner has not established that Greenberg, which is directed to a pet flea collar surface porosity control additive for controlling insecticide released to warm blooded animals (e.g., cats and dogs) wearing such a collar for about 90 days, would have suggested introducing a void-forming material as part of an inner coating layer of the roofing granules of Skadulis?

PRINCIPLES OF LAW

It is well settled that the burden of establishing a prima facie case of non-patentability resides with the Patent and Trademark Office (PTO). *See In re Piasecki*, 745 F.2d 1468, 1472 (Fed. Cir. 1984).

A sustainable obviousness rejection must be accompanied by "some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness." *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006) (quoted with approval in *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 418 (2007)).

FINDINGS OF FACT

The Examiner states:

> Skadulis fails to teach that the first layer further contains a void-forming material that release gaseous material at temperatures above 90°C, and have an average particle size no larger than 2mm, which form pores upon firing, and the second layer does not have a void-forming material (Claims 3 and 28).

Skadulis discloses adding a water insoluble compound, such as Cu_2O, to a roofing granule coating mixture, as an algaecide, that is effective for a long period of years (col. 2, ll. 37-52).

Skadulis exemplifies the use of Cu_2O in a second (outer) or first (inner) roofing granule coating mixture, wherein each mixture includes binder (sodium silicate) and kaolin clay (Examples 1 and 3, respectively, col. 4, ll. 11-75, col. 5, ll. 11-40). In Example 1, colorant (TiO_2) is present in the first and second coating compositions and a reddish off-white colored product granule is obtained (col. 4, ll. 11-49). In Example 3, colorant (TiO_2) and cobalt blue stain) is present in the second coating composition and bluish-gray colored granules were obtained (col. 5, ll. 11-36).

Joedicke discloses roofing granule coatings wherein binder, such as sodium silicate, coloring pigment, and a gas forming compound are employed (Abstract).

Joedicke teaches that adding gas-forming compounds, such as hydrogen peroxide, to a coating composition (paint), prior to coating the granule, enhances film opacity via light scattering micro voids formed during film drying, which voids can reduce pigment requirements (col. 2, l. 60- col. 3, l. 5).

Joedicke teaches that titanium dioxide (TiO_2) is a preferred pigment for white coatings (col. 3, ll. 31-36).

Joedicke discloses that:

> Granules may be coated in one or more coats with any desired amount of coating material and gas forming compound may be used in any one or more of the coatings. Gas forming compound is preferably used in the outer coating. . . In a

> particularly preferred embodiment of the invention and in accordance with conventional practice, two separate coatings are preferably used to produce white colored granules with the innermost coating comprising between about 50 and about 70 pounds per ton of granules on a dry basis and containing little or no titanium dioxide and no gas forming compound. The outer coating is preferably used in amounts between about 40 and about 50 pounds per ton of granules on a dry basis and contains TiO_2 and gas forming compound.

(col. 5, ll. 37-51).

Joedicke provides an Example 2 wherein gas forming compound is added to a second coat and not the first coat applied to roofing granules (Example 2, col. 6, l. 52 – col. 7, l. 38). Results presented for the Examples are said to establish that such gas forming compound addition, compared to a control, reduces the amount of titanium dioxide needed for a given level of lightness (Example 2, Table II, col. 7, ll. 18-38).

Greenberg discloses a pet collar made from resins, such as PVC, that includes an insecticide for fleas, such as dimethyl 1,2-dibromo-2,2-dichloroethyl phosphate (naled), and a surface porosity control component that is said to increase surface porosity of the resinous collar so as to release adequate amounts of the insecticide for control of fleas for several months on an animal (e.g., cat or dog) wearing the collar (Abstract, col. 4, l. 59 – col. 6, l. 38).

Greenberg teaches that "[t]he main function of the [surface porosity control] additive is to provide a surface porosity which preferably includes pores extending part way into the body of the collar" (col. 5, ll. 21-23).

Greenberg teaches that the additive component is used in amounts such that the collar "strip releases naled gas at a rate effective to control

fleas throughout a period of at least 90 days without forming droplets on the strip" (col. 5, ll. 48-54).

In a declaration under 37 C.F.R. § 1.132, Dr. Hong, a named co-inventor of the subject application, states, *inter alia*, that:

> 7. With respect to the Examiner's comment in Paragraph 5 of the Examiner's Action that U.S. Patent 4,378,408 ("Joedicke '408") teaches that roofing granules may be coated in multiple coats with any desired amount of coating material and gas-forming compound may be used in any one of multiple coatings to greatly enhance film opacity and afford significant pigment reductions, particularly TiO_2, in whites (referencing column 5, lines: 38-41), in my opinion one of ordinary skill in this art would have a different understanding of Joedicke '408's teaching. In particular, one of ordinary skill in the art would understand that the effectiveness of microvoids created by gas-forming compounds such as sodium perborate in enhancing the opacity of a multiply layer coating would depend on several parameters, including (1) the specific layer in which the microvoids were created, (2) the composition of the microvoid-carrying layer, (3) the existence of one or more layers exterior to the microvoid-carrying layer and their respective compositions. Thus, while the presence of microvoids in an interior layer coated with a clear, pigment-exterior layer could contribute significantly to the opacity of the entire composition, to the extent the exterior layer or layers includes pigments, the contribution to the opacity of the entire coating composition from microvoids present in interior layers becomes correspondingly less significant. The pigmented outer layer or layers mask or hide the inner layer, so that light scattering is diminished or extinguished entirely.
>
> 8. One of ordinary skill the art would also understand that while light colored coating compositions may be improved by the presence of microvoids, similar improvement is not to be expected in the case of dark colored coating compositions, which tend to absorb light rather than reflect light. On the contrary, one of ordinary skill in the art would understand the adding light-scattering microvoids to a coating composition

having a dark color would tend to work against the colored pigment, by lightening the coating, thus requiring more pigment to achieve a desired color, rather than less as in the case of a light-colored coating composition, such as a white coating composition pigmented with titanium dioxide.

ANALYSIS

Rejection over Skadulis and Joedicke

All of the claims on appeal are drawn to a process of producing algae-resistant roofing granules wherein a gas-generating void forming material, together with at least one algaecidal material, are included in a first composition used for coating inert base particles with a first inner layer and wherein such void-forming material is not present in a second outer coating composition used in forming a second coating layer, and wherein pores are formed in the first inner layer due to the release of gas by the void forming material presence upon subjecting the coated particles to heat (see independent claims 3 and 23).

In the first stated rejection, the Examiner relies on Skadulis for disclosing a process of coating roofing granules with more than one layer of alkali metal silicate-clay coating composition, wherein the coating composition for the inner or outer layer includes an algaecidal material (Cu_2O), as generally indicated above and as set forth by the Examiner in the Answer (Ans. 3-4). The Examiner expresses the rejection position noting that Skadulis does not disclose employing void-forming material, as Appellants' claimed process requires (Ans. 4). As the Examiner notes, Skadulis presents an Example I wherein pigment (titanium dioxide) is added to first and second layers, and Cu_2O to the second (outer) layer and an

Example III wherein color pigment (titanium dioxide) forms part of the second (outer) later coating composition and Cu_2O is added as part of the first coating layer composition (Ans. 5). In Example III, Skadulis includes cobalt blue stain in the coating composition for the outer (second) layer (col. 5, l. 29).

While Joedicke notes that roofing granules can be subjected to coating using one or multiple coats using any desired amount of coating material and wherein gas forming compound may be used in any one or more of the coatings as urged by the Examiner, Joedicke also teaches that the gas forming compound is employed to reduce pigment requirements by forming light scattering micro-voids (Ans. 5). In other words, Joedicke, when read in appropriate context, suggests that the gas forming compounds work as pigment reducing compounds only if an effective amount of light reaches the voids formed in any layers containing same such that the light could be scattered.

Thus, Appellants reasonably assert that the Examiner assumes too much from the teachings of Joedicke and Skadulis by asserting that one of ordinary skill in the art would have been led to add "inexpensive gas forming compounds [of Joedicke] to the first layer [composition] of Skadulis containing a TiO_2 pigment with the expectation of providing the desired light color at significant TiO_2 pigment reduction" (Ans. 5). This is basically because the Examiner has not reasonably established that one of ordinary skill in the art would have expected that any significant light would have reached the first (inner)layer of Skadulis for the gas forming compounds to be of any benefit if added only to the inner first layer of the Example I method of Skadulis given that the second layer of Skadulis' Example I includes a significant amount of titanium dioxide in addition to Cu_2O, clay

and sodium silicate binder applied thereto, as urged by Appellants (App. Br. 4-10; Reply Br. 1-6; Hong Decl., para. 7). We agree with Appellants.

On this record, we reverse the Examiner's obviousness rejection of claims 3, 4, 7, 11, 16-21, 23, 28-32, and 36-41 over Skadulis and Joedicke.

Rejection over Skadulis and Greenberg

As for the Examiner's proposed combination of Greenberg with Skadulis, the Examiner maintains that:

> It would have been obvious ... to have incorporated particles of heat decomposable gas forming compound to a coating composition of a *toxicant containing first layer* in Skadulis with the expectation of providing the desired release rate by controlling texture and porosity of the layer with the use of particles of gas forming heat decomposable compound, as taught by Greenberg.

(Ans. 6-7)

Even if we agreed, *arguendo*, with the Examiner that Greenberg represents analogous art to the extent that Greenberg is concerned with controlling the release of a component that reduces the growth of or eliminates an organism at a location that the organism is not desired to be located on, the Examiner has not reasonably explained how the teachings of Greenberg with respect to incorporating an additive in a flea collar for providing pores extending from a surface thereof for releasing a particular insecticide gas would have suggested, to one of ordinary skill in the roofing granule formation art, the addition of a gas forming component to only an inner coating layer of the roofing granules of Skadulis for forming pores in the interior layer, much less a component that would have been effective for controlling the release of an algaecidal material, such as cuprous oxide, from such an interior location, as urged by Appellants (App. Br. 16-17).

On this record, we reverse the Examiner's obviousness rejection of claims 3, 4, 7, 11, 16-21, 23, 28-32, and 36-41as being unpatentable over Skadulis in view of Greenburg.

Additional Rejections

As for the Examiner's separate rejections additionally applying McMahon to dependent claims 12, 13, and 33 and Hojaji to dependent claims 14, 15, 34, and 35, we note that the Examiner relies on these additional references for features of the dependent claims and does not further explain how either of these added references would have rendered the subject matter required by the independent claims 3 or 23 obvious, within the meaning of 35 U.S.C. § 103(a). Accordingly, on this record, we shall also reverse the Examiner's obviousness rejections of these dependent claims.

CONCLUSION

Appellants have established reversible error in the Examiner's obviousness rejection over Skadulis in view of Joedicke by asserting that the Examiner has not reasonably established that Joedicke would have suggested introducing a light scattering gas forming compound only as part of an inner coating layer of the roofing granules of Skadulis, without furnishing persuasive evidence establishing that the outer layer coating of Skadulis would not have been expected to forestall light transmission into the inner layer.

Appellants have established reversible error in the Examiner's obviousness rejection over Skadulis in view of Greenberg in asserting that the Examiner has not shown that Greenberg's teachings concerning a pet

flea collar surface porosity control additive used for controlling insecticide released to warm blooded animals (e.g., cats and dogs) wearing such a collar for about 90 days, would have suggested adding such a surface porosity forming material as part of only an inner coating layer of the roofing granules of Skadulis for algaecide release purposes.

ORDER

The Examiner's decision to reject the appealed claims on the grounds of record is reversed.

REVERSED

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